



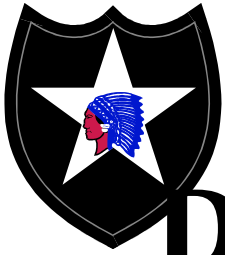
**702<sup>nd</sup> Main Support Battalion**



# **Drivers Training**

## **NIGHT VISION GOGGLE**

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# **DRIVER PREPARATION**

- KEEP PHYSICALLY FIT
- EAT A WELL-BALANCED MEAL
- GET ADEQUATE REST
- AVOID SELF-MEDICATION
- AVOID THE USE OF TOBACCO & ALCOHOL
- AVOID BRIGHT LIGHTS AFTER DARK ADAPTATION
- AVOID BRIGHT SUNLIGHT DURING THE DAY

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## **EFFECTS OF LIGHT**

NVG compatibility is best achieved by eliminating all interior and exterior lighting.

Vehicle gauges can be read with NVGs without the aid of interior lighting.

Lasers will be used on the battlefield. Most lasers will not cause permanent damage to NVGs.

Viewing an area lit by artificial lights, such as flares, will limit your ability to see objects outside the lighted area. Try to keep the light source outside the field of view of the goggles.

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A halo around artificial lights as seen through the



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## SOURCES OF AMBIENT



### LIGHT

Moon The moon provides the greatest source of ambient light at night. Light from the moon is brightest when the moon is at its highest point in the sky.

Background lighting Besides the moon, other natural light sources contribute to night brightness, such as the aurora (northern lights) and starlight.

Artificial lights Lights from cities, cars, fires, and flares are sources of illumination.

Solar light This light is usable for certain periods following sunset and before sunrise.

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## VISUAL PROBLEMS



### AFFECTING NIGHT VISION

Presbyopia - is common in individuals over 40 years of age. Makes seeing small items difficult, especially in red light.

Night myopia - occurs in a person who is nearsighted. Blurred vision at night will be experienced.

Astigmatism - produces an out-of-focus condition in the eye. For example, if you focus on power poles, the wires will be out of focus in most cases.

Dark adaptation - This is the process by which your eyes increase their sensitivity to low light levels.

Maximum dark adaptation is reached in about 30 to 45 minutes. Exposure to a flare or light source

require 5 to 45 minutes for night vision recovery

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# DEPTH PERCEPTION

THE QUALITY OF SEEING OBJECTS  
AS THREE-DIMENSIONAL SOLIDS IN SPACE

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## SELF - IMPOSED STRESSES

Smoking The smoker effectively reduces 20 percent of night vision at sea level.

Alcohol This impairs both coordination and judgment.

Fatigue When you are tired, you are not mentally alert, fatigue will slow down your response to night situations.

Nutrition Hunger pains lead to distraction and shortened attention span.

Physical conditioning You should exercise daily. Good physical conditioning will help you conduct night driving with less fatigue.

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Sleep Night driving is more tiring and stressful than



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# DRIVING WITH GOGGLES

Developed through continuous practice.

NVGs should never be used on public highways. If the light is sufficiently bright, the devices all have a bright source protection feature that shuts down the NVG to protect it. If activated the NVG will shut off for at least 2 seconds.

Operating a vehicle with the goggles over the NBC mask will further reduce your field of vision to about 20 degrees. (This practice is not recommended).

Primary operators must focus their goggles for distance vision even though this will make instrument reading difficult. Assistant drivers can compensate for this by alternating between distance and close up

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## NIGHT TACTICAL



### OPERATIONS PRECAUTIONS

1. If a flash or high-intensity light is expected from a specific direction, turn the vehicle away from the light source. If direction is not known, close one eye. Once the light source is no longer a factor, the eye that was closed will provide enough night vision to continue driving.

The reason for this is dark adaptation occurs independently in each eye.

2. Select routes to avoid built-up areas.

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3. Use short bursts of fire when firing automatic



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# **NVG CONTROLLED TRAINING AREA**

To minimize the effect on NVGs by the headlights from an oncoming vehicle while avoiding a potentially serious accident, slow down, look away so that the light source is just outside the goggles field of view, and pull off to the far right hand side of the road.

If your vehicle malfunctions slow down and pull off to the far right side of road. Warn other drivers using hand and arm signals and chemical light source. (DO NOT USE 4 WAY FLASHER).

If the NVGs low battery indicator turns on, replace batteries. DO NOT WAIT use above method. **WARRIOR TRAINING** over.



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# **GENERAL CHARACTERISTICS CONTINUED**

Battery When installing or removing a battery have selector switch turned off, remove battery when storing.

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# **DEPTH PERCEPTION AND**

## **DISTANCE ESTIMATION**

- The best range for depth perception is 20 to 500 feet.
- NVGs decrease depth perception at distances less than 20 feet or greater than 500 feet.
- Best case depth perception capability will be less than daytime unaided but better than nighttime unaided.
- Focal range The focal range of the NVG is 10 inches to infinity.

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# **ILLUMINATION**

- Cloud coverage of the moon and stars.
- High moisture content (dew).
- Fog, dust, haze, and smoke.

**Note:** A lighting flash one weather phenomenon that increases illumination.

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## GENERAL CHARACTERISTICS

- Single-color viewing All objects viewed through the NVGs will appear green.
- Monochromatic (one-color) adaptation. Upon reentering a high light area after wearing NVGs for an extended time, you may experience a tint or discoloration viewed with an unaided eye.
- Dark adaptation Under ideal conditions expect to regain dark adaptations expect to regain dark adaptation in about 2 minutes after wearing NVGs.
- Spatial disorientation Dizziness and nausea may be caused by driving with one tube focused inside the vehicle and the other outside the vehicle.

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- Third generation tubes have increased performance and



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## DISADVANTAGES



NVG performance is reduced in rain haze, fog, snow, or smoke. Also NVGs do not magnify images viewed through the tube. An object viewed through the goggles at night will be the same size as if it were seen during the day without the goggles.

Visual acuity The best case for a driver with 20/20 vision is 20/40 with the PVS-7.

Field of view The field of view with the NVGs is 40 degrees compared to 200 degrees unaided.



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## VISION



This is the most important sense you use while driving. It is the sense that makes you aware of the position of your vehicle in relation to the road.

You need good depth perception for determining height and distance, good visual acuity for identifying terrain features and obstacles, and good night vision techniques for efficiency in night operations.

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## THREE TYPES OF VISION

Photopic vision - Is used during daylight hours or when a high level of artificial light exists.

Mesopic vision - Is used at dawn, dusk, and during periods of mid-light levels. A reduction in color vision and visual acuity occurs as light level decreases.

Scotopic vision - Is used when low-light conditions exists, such as at night. Visual acuity decreases to 20/200 or less and total loss of color vision occurs.



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## VISUAL ILLUSIONS



**Auto kinesis** When a person stares at a still light in the dark, the light will appear to move in about 8 to 10 seconds.

**Relative motion** A person sitting in a car waiting for a train to pass often experiences the illusion of relative motion. Even though the car is not moving, you may have the sensation it is.

**Structural illusions** These are caused by heat waves, rain, snow, or other factors that obscure vision. (For example) a straight line may appear to be curved when seen through a heat wave.



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# UNACCEPTABLE FAULTS

Shading Tubes should show a perfect circle. If there is shading you will not see a full circular image.

Edge glow: This is a bright area in the outer portion of the viewing area.

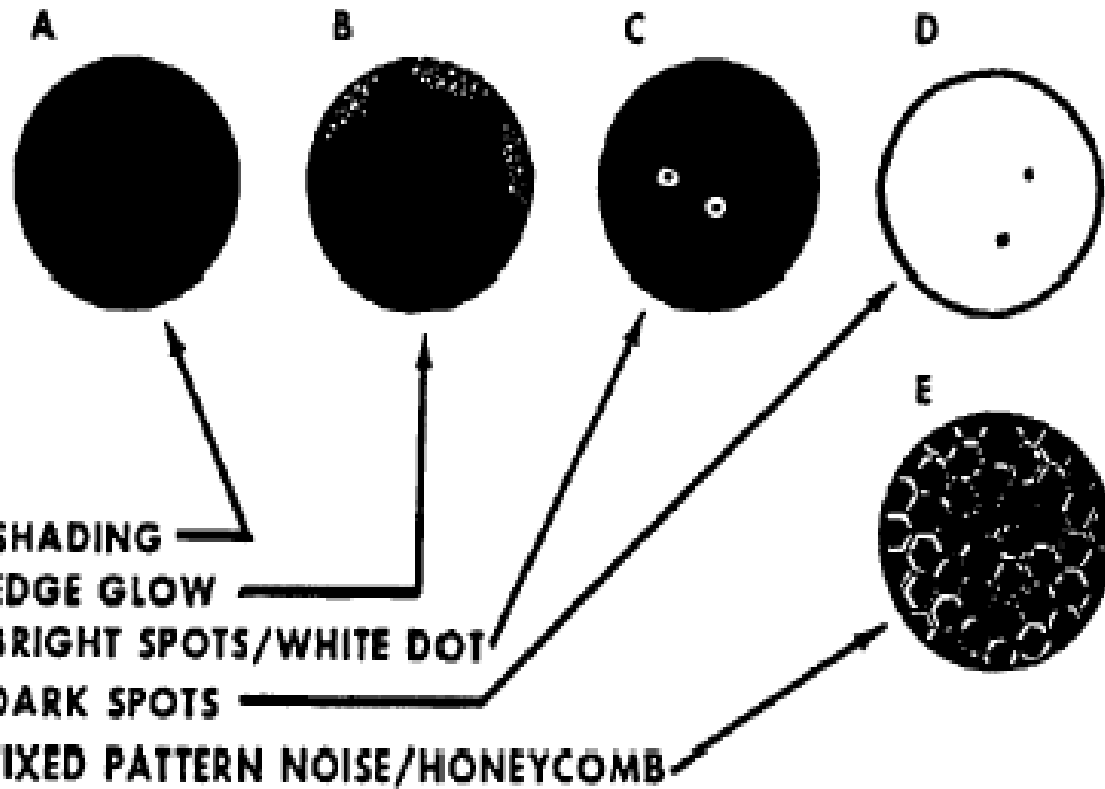
Bright spots/white dots: This condition is caused by a pinhole in the phosphorous screen.

Flashing, flickering or intermittent operation. The NVG may appear to flicker on an off. If occurs more than 1 time consult operator's manual.

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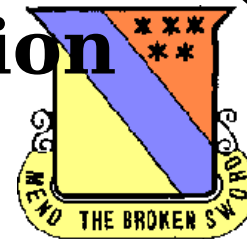
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# ACCEPTABLE FAULTS

Dark spots/black dots These are acceptable as long as it doesn't interfere with the mission.

Fixed pattern noise/honeycomb Acceptable as long as it doesn't interfere with the mission.

Goggle operating temperature AN/PVS-7 113 to -60.

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# WHAT ARE NIGHT VISION GOGGLES?

NIGHT VISION GOGGLES ARE DEVICES THAT MAKE AN

OBJECT MORE VISIBLE DURING PERIODS OF LOW LIGHT

LEVELS. THEIR PERFORMANCE IS DIRECTLY RELATED TO

THE AMOUNT OF LIGHT AVAILABLE, SUCH AS STARLIGHT

AND MOON LIGHT.

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## ADVANTAGES

- BETTER VIEW OF THE SURROUNDING AREA AND OBJECT IDENTIFICATION AT NIGHT

- NVG MAKE IT POSSIBLE TO:

READ

PATROL

PROVIDE MEDICAL AID

DRIVE

OBSERVE THE ENEMY

AT NIGHT

WITHOUT THE

HELP OF  
LIGHTS

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